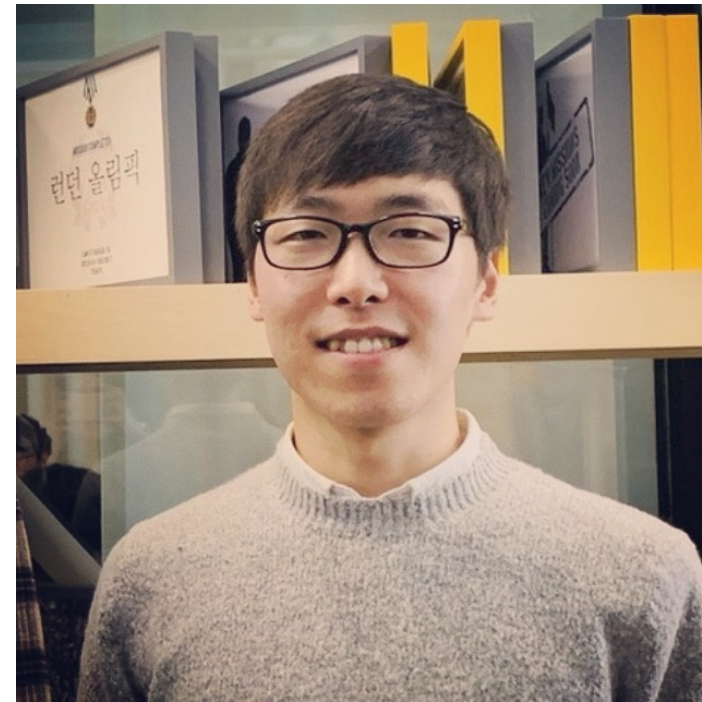


# Programming Languages (PL) Lab

## 이원열 교수

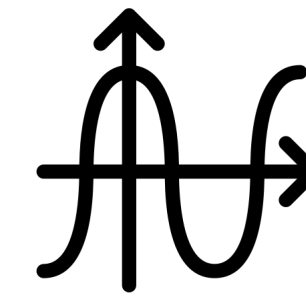
- POSTECH 조교수 (2024-현재)
- CMU 포닥 (2023-2024)
- Stanford 박사 (2023)
- POSTECH 학사 (2014)



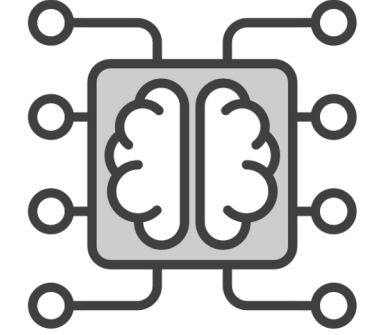
## 연구 분야



프로그래밍언어

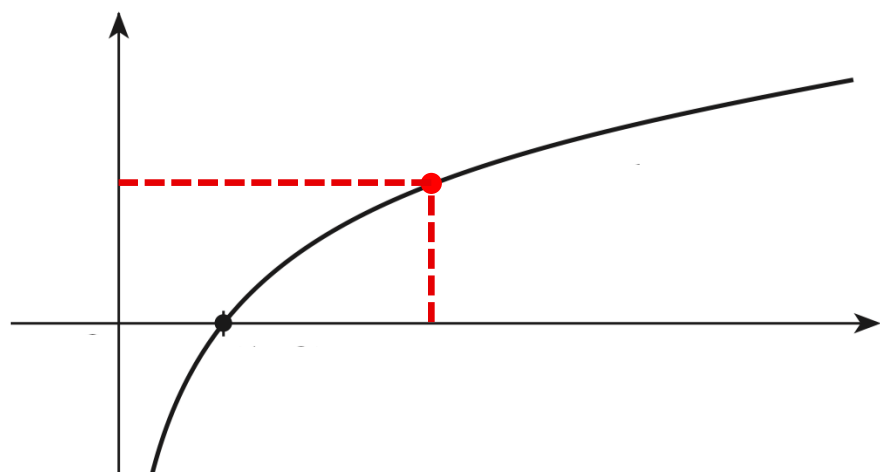


수치계산



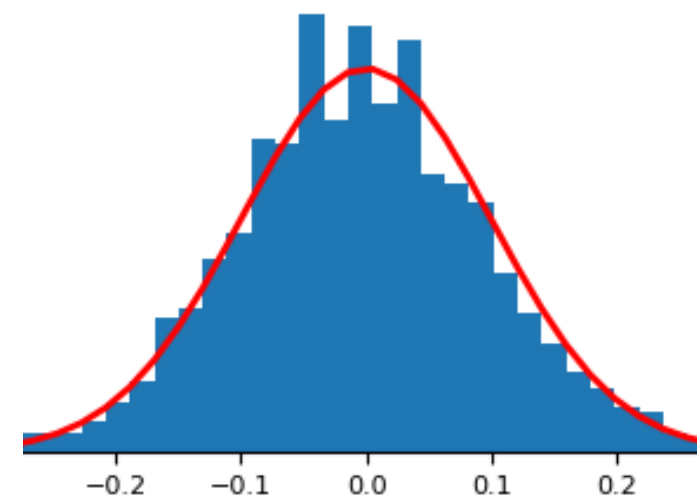
기계학습

## 연구 주제



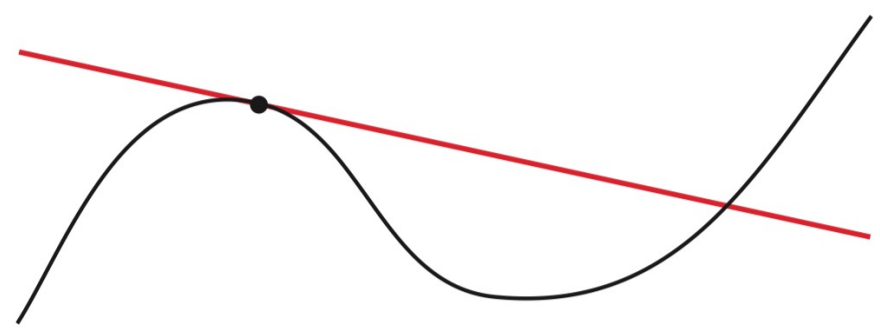
수학함수 계산

(예:  $\log(x)$  계산하기)



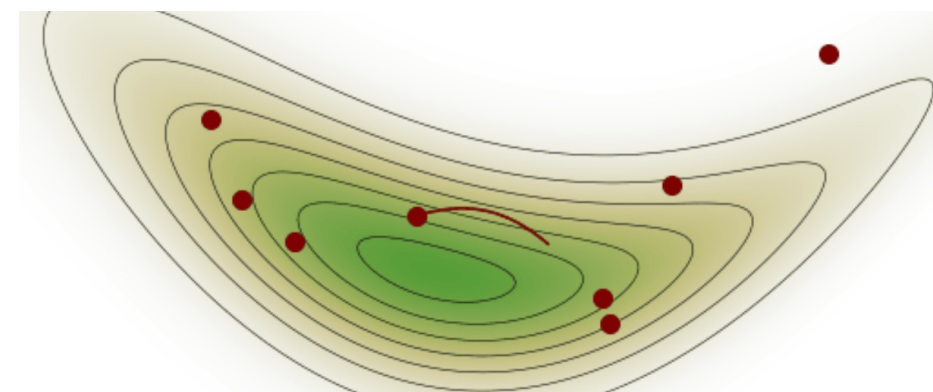
확률분포 샘플링

(예:  $\mathcal{N}(\mu, \sigma^2)$ 에서 샘플링하기)



자동 미분

(예:  $\nabla f(x)$  계산하기)



확률적 추론

(예:  $p(z|x)$ 에서 샘플링하기)

## 연구 성과

- PL 분야: 최우수학회 논문 9편 (POPL 5편, PLDI 3편, CAV 1편)
- ML 분야: 최우수학회 논문 6편 (NeurIPS 2편, ICML 2편, ICLR 1편 등)

## 주요 논문

- CAV 25 Floating-Point Neural Networks Are Provably Robust Universal Approximators
- ICML 25 Floating-Point Neural Networks Can Represent Almost All Floating-Point Functions
- PLDI 25 Random Variate Generation with Formal Guarantees
- PLDI 25 Semantics of Integrating and Differentiating Singularities
- ICLR 24 What Does Automatic Differentiation Compute for Neural Networks?
- ICML 23 On the Correctness of Automatic Differentiation for Neural Networks with Machine-Representable Parameters
- POPL 23 Smoothness Analysis for Probabilistic Programs with Application to Optimised Variational Inference
- NIPS 20 On Correctness of Automatic Differentiation for Non-Differentiable Functions

# Programming Languages (PL) Lab

## 이원열 교수

- POSTECH 조교수 (2024-현재)
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- POSTECH 학사 (2014)

## 연구 주제

올바른 값을 계산하는가?  
더 빠르게 만들 수는 없나?  
이론적 한계는 없나?



GNU Math/Scientific Library

intel Intel MKL



NumPy



SciPy



TensorFlow



PyTorch



JAX



Pyro



Stan

...

자동 미분

(예:  $\nabla f(x)$  계산하기)

확률적 추론

(예:  $p(z|x)$ 에서 샘플링하기)

- ICML 23 On the Correctness of Automatic Differentiation for Neural Networks with Machine-Representable Parameters
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